Developing a Cost-Effective Visual Aid Device to Mitigate the Effects of Retinitis Pigmentosa

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Retinitis pigmentosa (RP) is a genetically inherited eye disorder affecting 1 in 4000 people worldwide, characterized by progressive devolution of retina that leads to progressive visual loss. Typical symptoms include night blindness, which is followed by decreasing visual field, leading to tunnel vision. Unfortunately, the specific cause of RP is not known and there is no cure. The disease is managed by using visual aids that are currently very expensive, ranging between $3000 to $8000. This creates a need to develop affordable glasses for the common man. 3D-printed glasses were developed that enhanced the peripheral vision of the mocking RP patient (student researcher), using external smartphone wide-angle lenses. To test different tunnel visions, 3D printed circular discs with hole sizes of 1 mm, 3 mm, 5 mm, 7 mm and 9 mm were created, representing the severity of RP disorder in different people. These discs were inserted in the frames of 3D printed glasses with and without wide-angle lenses. The student researcher validated these glasses on a bullseye model and observed nearly two times higher visual field using wide-angle lens glasses. Three replications data was collected comparing normal vision with and without wide-angle lens, and different levels of RP (using tunnel vision discs) with and without wide-angle lens. Statistical analysis further confirmed that the increase in visual field using wide-angle lenses is statistically significant. The cost of developing student RP glasses is $22, and a complete kit including ‘do-it-yourself’ instructions will be developed.

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